



Review Article

12 guiding premises of pediatric cochlear implant habilitation

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It has been almost 35 years since the editor of this issue, Dr. Richard Miyamoto, introduced me to the child who would be my first pediatric cochlear implant (CI) patient. Dr. Miyamoto had hired me as part of his co-investigator team at Indiana University School of Medicine. He had implanted many adults over the previous 5 years, but entering into the world of pediatric cochlear implantation was truly a remarkable frontier. That first child, implanted with a single-channel House 3M device, taught me a great deal about how electrically-evoked hearing could contribute to the development of speech, language and literacy in a deaf child. Since that time, Dr. Miyamoto and I have a combined experience working with over two thousand children with CIs, and each one has taught us something unique. We have witnessed remarkable advances in implant technology, the

provision of universal newborn hearing screening in the United States, and the very early fitting of hearing technology (traditional amplification and cochlear implants) on babies. It is difficult not to stand in awe of how well most children with implants are learning to listen and talk, to integrate in their neighborhood schools, play musical instruments, and even become bilingual in two or more spoken languages. These benefits, however, occur in those children who receive both excellent surgical placement of their devices and well-designed follow-up habilitation. Surgical insertion of the device is not enough, as Dr. Miyamoto often reminded us. When team members work together to provide a program that includes intensive listening and spoken language habilitation, the rewards are great.

In this article, I will review twelve guiding premises that form the foundation of habilitation for prelingually deaf children with CIs.¹ These premises are an amalgam of research findings and clinical experience with a broad range of implanted children. Note that much of what enhances learning in children wearing CIs is consistent with communication developmental in all children. We believe that a developmental approach needs to be taken to its fullest manifestation over a protracted period of time in children

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with CIs in order for them to enjoy high levels of auditory, spoken language and literacy success. The 12 guiding principles are presented in three groups: over-arching goals; learning environment, content and experience; and monitoring progress.

Premises 1 and 2: Over-arching goals

Premise 1. The child must learn to attach meaning to what is heard through the CI

To learn a spoken language via a CI, two conditions must be met. First, the listener must have sufficient (not necessarily perfect) auditory access to the language code – the vowels, consonants, and suprasegmental patterns that make up that language. Put simply, a child must be able to hear a language in order to learn it. Think of an English speaker trying to learn Portuguese, for example, while being taught through a soundproof window. There is little chance that anyone could learn Portuguese this way. But even if a child has access to the sound and patterns of a language, a second critical condition must also be met: The sounds must gradually be attached to meaning. Attaching meaning to the sounds transmitted by a CI is a critical task, whether it is a postlingual child who must re-map the new signal onto an existing linguistic code or a child with pre-lingual deafness who must develop the code de novo. The CI and its technology provide access, but habilitation, parental follow-up, a nurturing auditory and spoken language environment at home and at school, and the child's own developing cognitive abilities create the opportunities for sounds to become meaningful. If meaning is not established, a child is unlikely to demonstrate functional benefit from CIs. In addition, the older the child at the he receives CIs, the more intensive and didactic the habilitation will need to be to ensure that sound becomes meaningful. For older children who have not heard before, habilitation becomes rehabilitation.

Premise 2. The ultimate goal for all children with hearing loss, including those with CIs, is communicative competence

By communicative competence we mean that a child can understand and utilize human communication at a level consistent with his age and cognitive ability. Modes of communication for children with hearing loss are on a spectrum from highly oral to highly visual. Some children with CIs will learn to rely heavily on their listening abilities. For others, communicative competence will include the use of sign language or cued speech, either full-time or only in academic settings, or only for receptive clarification. There is an assumption, though, that if parents have sought CIs, they value their child's auditory and spoken language skills and intend to devote energy to improving them. Parents should be encouraged to select the options for their child that reflect the values they hold as parents, consistent with their goals for their child's future.

Premise 3, 4, 5: The learning environment

Premise 3. If they are to be useful, skills learned in the therapy room must generalize into the classroom, home, and other aspects of the child's everyday world

Clinicians must develop and practice skills within the therapy room but always with the greater goal that those skills will generalize out of the therapy room, into the child's classroom, home setting, and other everyday environments.

Parents are primary agents in their child's communicative competence and overall development, as we have learned from research and clinical experience. I believe clinicians are most effective when they view their role largely as one of helping parents facilitate their child's communication development day in and day out, within the scope of daily interactions and family life. For older children whose parents are not at school every day, it is especially important to convey the message that parents are essential to their child's success. Sharing of information between home and school has great benefit for all involved and can be accomplished in a variety of ways, including through a communication notebook that travels from home to school and back. It is helpful for parents to complete an interview such as the Children's Home Inventory for Listening Difficulties (CHILD) that reflects the child's auditory behaviors in the home.² Clinical experience suggests that strong parental involvement can sometimes negate the effects of a weak educational setting, whereas the reverse is far less likely.

Premise 4. Habilitation sessions should integrate goals of speech, language, perception, and pragmatics within an environment that has appropriate social/emotional context

Clinicians often write habilitation plans that isolate different domains of communication, writing separate goals for the child in each of these domains. Through that process, we break apart the complex, unified phenomenon of communication into artificially separate pieces. Our challenge in rehabilitation is to address those goals but to do so in a way that integrates or reunifies the pieces into a whole. This is a goal that is not always achievable in every rehabilitation session. Sometimes we must practice and help a child over-learn a particular skill through a traditional drill method that is unlike natural communication. This is acceptable, as long as the clinician seeks to put that skill back into purposeful communication as soon as the child is capable. We seek to use what Fey has termed a "hybrid" approach to intervention, balancing structured practice with naturalistic interactions.³

Premise 5. Parents are the most potent influence on the child's progress

Due to the identification of hearing loss in babies via universal newborn hearing screening (UNHS) in the United States and other countries, and the growing number of

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